bridging pages 17 and 18 of the specification discloses that "[t]he biological activity of ALK-7 is related to some of the activities of the cell which include, but are not limited to, cell proliferation, mitogenesis, metastasis, tumor escape, cell adhesion transformation or apoptosis." Further disclosure is on page 30, lines 1-6, where "cancer" is recited as the abnormal condition in which the ALK-7 signal transduction pathway plays a role. Further, on pages 89-91, ALK-7 RNA transcripts were found to be overexpressed in lung cancer cells as compared to normal lung tissue.

The instant specification also discusses another role for ALK-7 protein in normal tissues. ALK-7 is expressed in restricted regions of the brain, such as the hippocampus, hypothalamic nuclei, substantia nigra and pituitary, as disclosed on page 31, lines 7-14 of the specification. The data on pages 89-91 also supports that ALK-7 is overexpressed in substantia nigra and anterior pituitary tissue as compared to weak expression in the brain, posterior pituitary and cerebellum. Accordingly, expression of this gene could act as a marker for identifying these tissues.

Accordingly, the specification, in its entirety, provides sufficient evidence of the utility of the ALK-7 gene.

To further support Applicants' arguments that the specification correctly identifies the utilities of this gene, Applicants previously provided the post-published papers, Jornvall and Sebolt-Leopold. These papers further support the statements made in Applicants' specification that overexpression of this gene is associated with cancer and that normal expression of this gene is found in certain brain tissue. Jornvall and Sebolt-Leopold show both the cellular pathways in which ALK-7 is inherently involved in the cell and further confirm the utility of ALK-7 as a result of its inherent properties. Applicants submit that these publications provide evidence that ALK-7 is inherently involved in MAP kinase activation. One skilled in the art would know that the MAP kinase pathway has been identified as a target for cancer treatment, and one can conclude that ALK-7 also is involved with the processes involved in cancer.

To further support the claim of sufficient utility and enablement, applicants will provide a declaration by Dr. Douglas Clary, one of the inventors, of the present invention. Dr. Clary states that ALK-7 is expressed primarily in normal tissue of

the central nervous system. Dr. Clary states that Jornvall provides evidence of the utility of ALK-7 in neurons and neuronal precursors as evidenced by the role in a neuronal cell line, PC12.

Dr. Clary further states that ALK-7 was found to be expressed in certain tumor lines, such as the Calu-6 lung cancer cells. It is Dr. Clary's opinion that this result is indicative of the role of ALK-7 in promoting tumorigenesis or metastasis. He further notes that it is his opinion that Jornvall, previously cited, implicates the activation of ALK7 in the subsequent downstream activation of ERK MAPK pathway and the activation of SMAD2 and SMAD3, which supports the involvement of the promotion of carcinogenesis.

Applicants maintain that the specification in the specific portions noted above provides sufficient evidence of a specific, substantial and credible asserted utility for the claimed nucleic acids as explained by Dr. Clary.

As the utility of ALK-7 has been now substantiated, the use of the ALK-7 receptor to identify therapeutic agents for treatment of cancer or the inhibition of cancer growth, is a further specific utility that is described in the specification. *In re Brana* 51 F.3d 1560 (Fed. Cir. 1995) (finding specific utility). The specification also states that ALK-7 is useful for identification of agents for treatment of neurological diseases and conditions. The gene would also be useful in identifying certain neurological tissues. These uses constitute a substantial "real world" utility within the meaning of §101. As stated by the Federal Circuit, an invention lacks utility only if it is "totally incapable of achieving a useful result." *Brooktree Corp. v. Advanced Micro Devices, Inc.* 977 F.2d 1555, 1571 (Fed. Cir. 1992). The examiner has failed to demonstrate that the claimed proteins are incapable of achieving such a result.

In view of the above arguments and Dr. Clary's declaration and supporting documents, it is requested that this rejection be withdrawn.

CONCLUSION

Reconsideration of the rejections is requested. Should the Examiner believe that further discussion of any remaining issues would advance the prosecution, a

telephone call to the undersigned, at the telephone number listed below, is courteously invited.

Respectfully submitted,

Date January 13, 2003

By Jayme A. Huleatt

Jayme A. Huleatt
Attorney for Applicant
Registration No. 34,485

FOLEY & LARDNER
Customer Number: 22428
22428
PATENT TRADEMARK OFFICE
Telephone: (202) 672-5542
Facsimile: (202) 672-5399